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Microscopic origin of 1/8 anomaly in la2-x-y(Nd, Eu) y(Ba, Sr)xCuO4

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Abstract

We adopt a t1-t2-t3-J-G model for explanation of x≈1/8 anomaly in HTSC compounds. The calculated charge susceptibility has a maximum near (π, π) leading to charge density wave (CDW) formation with the CDW amplitude eQ = x in very narrow band regime at intermediate temperatures and near (π, π/2) as temperature approaches zero. The in-phase domain structure as a candidate for "stripe" picture is proposed. We propose an experiment to apply pressure, and predict fast increase of Tc at anomalous value x≈1/ 8 in the presence of CDW. The enhancement of Tc will decline when CDW are suppressed by pressure.

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Keywords

Charge density waves, X = 1/8 Anomaly